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[Dynamical response to supernova-induced gas removal] Dynamical response to supernova-induced gas removal in two-component spherical galaxies

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abstract We investigate dynamical response on size and velocity dispersion to mass loss by supernovae in formation of two-component spherical galaxies composed of baryon and dark matter. Three-dimensional deprojected de Vaucouleurs-like and exponential-like profiles for baryon, embedded in truncated singular isothermal and homogeneous profiles for dark matter, are considered. As a more realistic case, we also consider a dark matter profile proposed by Navarro, Frenk & White. For simplicity we assume that dark matter distribution is not affected by mass loss and that the change of baryonic matter distribution is homologous. We found that the degree of the response depends on the fraction of dark matter in the region where baryon is distributed, so that dwarf spheroidal galaxies would be affected even in a dark halo if they are formed by galaxy mergers in the envelope of the dark halo. Our results suggest that this scenario, combined with dynamical response, would make not only the observed trends but the dispersed characteristics of dwarf spheroidals.